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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/590,704	05/10/2007	Fumihiko Kimura	062916	4387
38834 7590 06/09/2009 WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036				
EXAMINER				
ORTIZ RODRIGUEZ, CARLOS R				
ART UNIT		PAPER NUMBER		
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/590,704

**Applicant(s)**

KIMURA ET AL.

**Examiner**

CARLOS ORTIZ RODRIGUEZ

**Art Unit**

2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 February 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7 and 9-34 is/are pending in the application.
- 4a) Of the above claim(s) 11-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7, 9 and 10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 August 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

#### **DETAILED ACTION**

1. Claims 1-7 and 9-34 are pending.
2. Claims 1-7 and 9-10 are rejected.
3. Claim 8 is cancelled.
4. Claims 11-34 are withdrawn from consideration.
5. The Abstract submitted 02/26/09 has been received and entered.
6. Replacement Sheets of Figure 8 and 50 have been received and entered.

#### ***Response to Arguments***

7. Applicant's arguments filed 02/26/09 have been fully considered but are moot in view of the new grounds of rejection. Please note that the rejection under 35 U.S.C. 101 is maintained because the body of the claim must positively recite the particular apparatus performing the method steps, not the preamble.

Furthermore, this application contains claim 11-34 drawn to an invention nonelected with traverse in the reply filed on 09/10/08. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim

remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

***Drawings***

8. The drawings are objected to because the drawings contain duplicate figures.

The sets below correspond to the duplicate figures:

- a. Figures 1 and 46.
- b. Figures 3 and 48.
- c. Figures 4 and 49.
- d. Figures 8 and 50.
- e. Figures 9 and 51.
- f. Figures 10 and 52.
- g. Figures 11 and 53.
- h. Figures 12 and 25 and 54 and 67.
- i. Figures 13 and 23 and 55 and 65.
- j. Figures 14 and 56.
- k. Figures 15 and 57.
- l. Figures 16 and 58.
- m. Figures 17 and 59.
- n. Figures 18 and 60.
- o. Figures 19 and 29 and 61 and 71.
- p. Figures 20 and 30 and 62 and 72.

- q. Figures 21 and 63.
- r. Figures 22 and 64.
- s. Figures 24 and 66.
- t. Figures 26 and 68.
- u. Figures 27 and 69.
- v. Figures 28 and 70.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Objections***

9. (Claim 3 Line 13) objected to because of the following informalities: The term “(referred to as the three-dimensional clothoid curve)” would be better if deleted because this term/clarification is already provided in Claim 2 Line 6. Appropriate correction is required.

10. (Claim 6 Line 2) objected to because of the following informalities: The term “wherein seven parameters” would be better if written as “wherein the seven parameters”. In order to clearly indicate that the seven parameters are the same seven parameters previously mentioned throughout Claim 4.

***Claim Rejections - 35 USC § 101***

11. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

12. Claims 1-7 rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 1-7 do not comply with 35 U.S.C. 101 because they are not tied to another statutory class (such as a particular apparatus) or transform underlying subject matter (such as an article or materials) to a different state or thing. The body of the claim must positively recite the particular apparatus performing the method steps.

***Claim Rejections - 35 USC § 102***

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

14. Claims 1-2 and 9-10 are rejected under 35 U.S.C. 102 (b) as being anticipated by Szu et al. U.S. Patent No. 5,909,965 (hereinafter Szu).

a. **Regarding claims 1 and 9-10**, Szu discloses generating a three-dimensional clothoid curve (C7 L6-32 - - see for example the expressions of the spatial Clothoidal curve);

and designing a shape of said industrial products based on the three-dimensional clothoid curve (C7 L27-39 and C8 L5-11 - - see for example using Clothoidal curves to design rolling element passages).

Szu implicitly discloses that each of a pitch angle and a yaw angle in a tangential direction of said three-dimensional clothoid curve is given by a quadratic expression comprising of a curve length or a curve length variable (C4 L65-67, C5 L1-7, C5 L58-65, C6 L28-36 and C7 L7-34 - - see for example that the curvature of a clothoidal curve varies continuously and proportionally linearly to its arc length from the initial point of the curve).

b. **Regarding claim 2**, Szu further teaches the industrial products being a machine including a mechanism in which a mechanical element having a mass moves and that a trajectory of motion of a mechanical element is designed by using the three-dimensional curve (C7 L33-38 and C8 L7-11 - - see for example designing rolling element passages using spatial clothoidal curves).

***Claim Rejections - 35 USC § 103***

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Szu et al. U.S. Patent No. 5,909,965 (hereinafter Szu) in view of Drennen et al. U.S. Publication No. 2002/0189385 (hereinafter Drennen).

a. **Regarding claim 3**, Szu teaches all the limitations of the base claims as outlined above.

But Szu fails to clearly specify the machine is a screw device including a mechanism in which a ball as the mechanical element moves, the screw device comprises a screw shaft having an outer surface on which a spiral rolling element rolling groove is formed, a nut having an inner surface on which a load rolling element rolling groove is formed so as to be opposed to the rolling element



rolling groove and a regression path is formed to connect a one end and the other end of the load rolling element rolling groove, and a plurality of rolling elements disposed between the rolling element rolling groove of the screw shaft and the load rolling element rolling groove of the nut and disposed in the regression path, and the regression path of the screw device is designed by using the three-dimensional curve.

However, Drennen teaches a screw device including a mechanism in which a ball as a mechanical element moves, the screw device comprises a screw shaft having an outer surface on which a spiral rolling element rolling groove is formed, a nut having an inner surface on which a load rolling element rolling groove is formed so as to be opposed to the rolling element rolling groove and a regression path is formed to connect a one end and the other end of the load rolling element rolling groove, and a plurality of rolling elements disposed between the rolling element rolling groove of the screw shaft and the load rolling element rolling groove of the nut and disposed in the regression path, and the regression path of the screw device is designed by using the three-dimensional curve (see for example the Abstract and Paragraphs 0002, 0007 and 0033).

Szu and Drennen are analogous art because they are from the same field of endeavor. They both relate to systems for designing/manufacturing products with three-dimensional curvature surfaces and products with three-dimensional curvature surfaces.

Therefore at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above teachings taught by Szu and combining them with the teachings taught by Drennen.

One of ordinary skill in the art would have been motivated to do this modification in order to obtain a smooth reversing motion increasing mechanical efficiency as suggested by Szu (see for example, C2 L53-55).

17. Claims 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Szu et al. U.S. Patent No. 5,909,965 (hereinafter Szu) in view of Drennen et al. U.S. Publication No. 2002/0189385 (hereinafter Drennen) and in view of Hirai et al. U.S. Patent 6,587,747 (hereinafter Hirai).

a. **Regarding claim 4**, the combination of Szu and Drennen teach all the limitations of the base claims as outlined above.

But the combination of Szu and Drennen fails to specifically express the three-dimensional clothoidal curve expressions of claim 4.

However, please note that the equation expressions, parameters and variables present in claim 4 are characteristics of the three-dimensional clothoid curve and are obtainable by performing mathematical manipulations known in this art.

Hirai teaches similar mathematical manipulations and expressions (see for example C8 L1-27).

Szu, Drennen and Hirai are analogous art because they are from the same field of endeavor. They all relate to systems for designing/manufacturing products with three-dimensional curvature surfaces and products with three-dimensional curvature surfaces.

Therefore at time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above teachings taught by the combination of Szu and Drennen and combining them with the teachings taught by Hirai.

One of ordinary skill in the art would have been motivated to do this modification in order to improve the smoothness of the path where a mechanical element moves as suggested by Hirai (see for example, C3 L29-36).

b. **Regarding claim 5**, the combination of Szu, Drennen and Hirai teach all the limitations of the base claims as outlined above. Hirai further teaches that a plurality of spatial points are specified in a three-dimensional coordinate system and these spatial points are interpolated by using a three-dimensional curve (see for example C4 L30-32 and C9 L48-55).

c. **Regarding claim 6**, the combination of Szu, Drennen and Hirai teach all the limitations of the base claims as outlined above. Szu further further teaches that, between a one three-dimensional clothoid segment and the next three-dimensional clothoid segment, positions, tangential directions, normal directions,

and curvatures of both the one and next three-dimensional clothoid segments are made continuous to each other, respectively, at the plurality of spatial points (see for example C5-C7).

d. **Regarding claim 7**, the combination of Szu, Drennen and Hirai teach all the limitations of the base claims as outlined above. The combination of Szu, Drennen and Hirai further teach the limitations of claim 7 because the equation expressions, parameters and variables present in claim 7 are characteristics of the three-dimensional clothoid curve and are obtainable by performing mathematical manipulations known in this art.

### ***Conclusion***

18. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carlos Ortiz-Rodriguez whose telephone number is 571-272-3766. The examiner can normally be reached on Mon-Fri 10:00 am- 6:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on 571-272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Carlos Ortiz-Rodriguez  
Patent Examiner  
Art Unit 2123

June 10, 2009

/Kideest Bahta/  
Primary Examiner, Art Unit 2123